2nd Annual International Forum on the Development of the Lake Chad Region

MAIN THEME OF THE FORUM

“REGIONAL INTEGRATION AND NATURAL RESOURCE RISK MANAGEMENT: SOLUTIONS FOR SUSTAINABLE PEACE AND ECONOMIC DEVELOPMENT IN THE LAKE CHAD REGION”

Niamey, du 23 au 25 mai 2023

Topic of the Presentation

Current State of Existing Geospatial Databases in Universities (BAY States Lake Chad Region - Nigeria)

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PRESENTATION OUTLINE

- Background
- Aim and Objectives
- Various Departments that Generate Data in BAY Universities
- Region of Interest (Vector and Raster Data)
- Geospatial Data Available
- Climate Data Available
- Attributes Data Available
- Opportunities
- Major Challenges

Background 1/2

- LCBC Member States collect, store and process data within their States;
- These data are fragmented in the States and are stored in different formats;
- Both the data and information collected at States and LCBC are subject to loss/damage;
- One of the assigned functions of LCBC is monitoring of Lake Chad and its environmental resources; and share to member states; or vis-visa;
- LCBC: Lake Chad Information System (LIS), in GIS framework as RDB, is meant to manage and share a wide range of data and information from all LCBC member states and other stakeholders;
- Thus, access to available knowledge on environmental resources of LCB via a regional database to strengthen collaboration comes timely.

Background 1/2

- Taking into consideration the MoU signed in December 2022 between 4 Universities in the LCB and LCBC,
- University of Maiduguri representing the Universities in the Nigerian Sector of the Lake Chad,
- University of Maiduguri, Borno State; Modibbo Adama University, Yola, Adamawa State; and Yobe State University, Damaturu, Yobe State, therefore,
- The University of Maiduguri, representing the Nigerian Universities in the LCB, is committed to present and share the existing data, particularly Geospatial to populate the KMP/LIS.

Aim and Objectives

- This presentation aims not only to present major Academic Departments and Centres that generate relevant data as input to LIS/KMP, but also indicate existing data for RGSDB @ **"Level A" (L-A)** within the Lake Chad Region for regional scientific collaboration.
- **Objectives are to:**
  - Show ROI for relevant Geospatial data available;
  - Indicate Attributes data available;
  - Present opportunities to **"L-B"**, in preparation for 3rd Forum; &
  - Discuss major challenges for sustainability

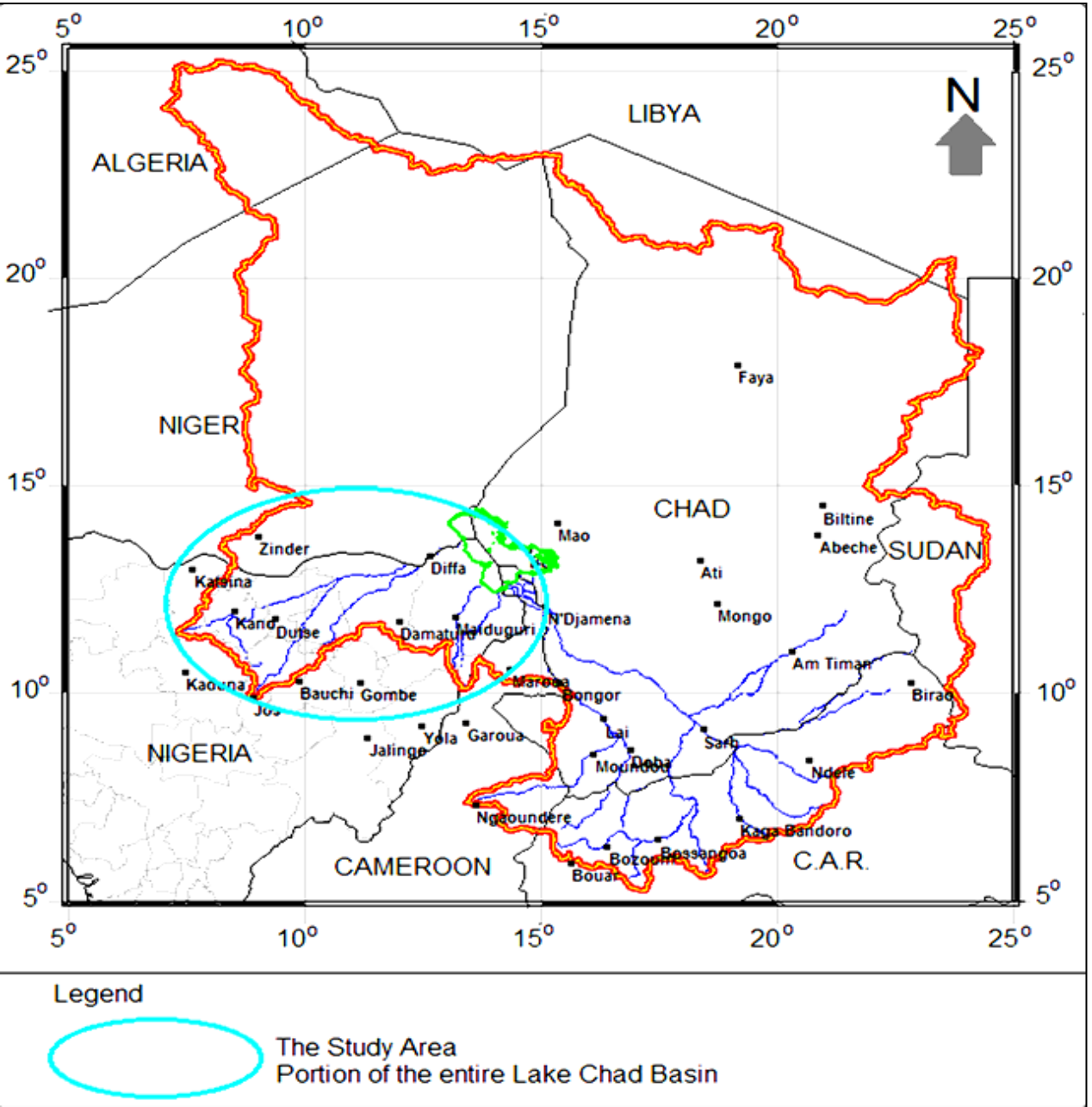
Data Generating Departments 1/2

- **Spatial and Attribute Data Generating Departments and Centres**
  - Department of Agricultural and Environmental Engineering;
  - Department of Civil and Water Resources Engineering;
  - Department of Environmental Biology;
  - Department of Forestry;
  - Department of Geography;
  - Department of Geology;
  - Department of Soil Science; and
  - Centre for Disaster Risk Management and Development Studies (CDRM&DS);
  - Water Resources Capacity Building Network Centre (WRCBNC)

Data Generating Departments 2/2

- **Social Data Generating Departments and Centres**
  - Department of Economics;
  - Department of Political Science;
  - Department of Sociology and Anthropology;
  - Centre for Peace, Diplomatic and Development Studies; and
  - Centre for the Study of Violent Extremism – New;

Region of Interest: ROI (Vector and Raster Data)

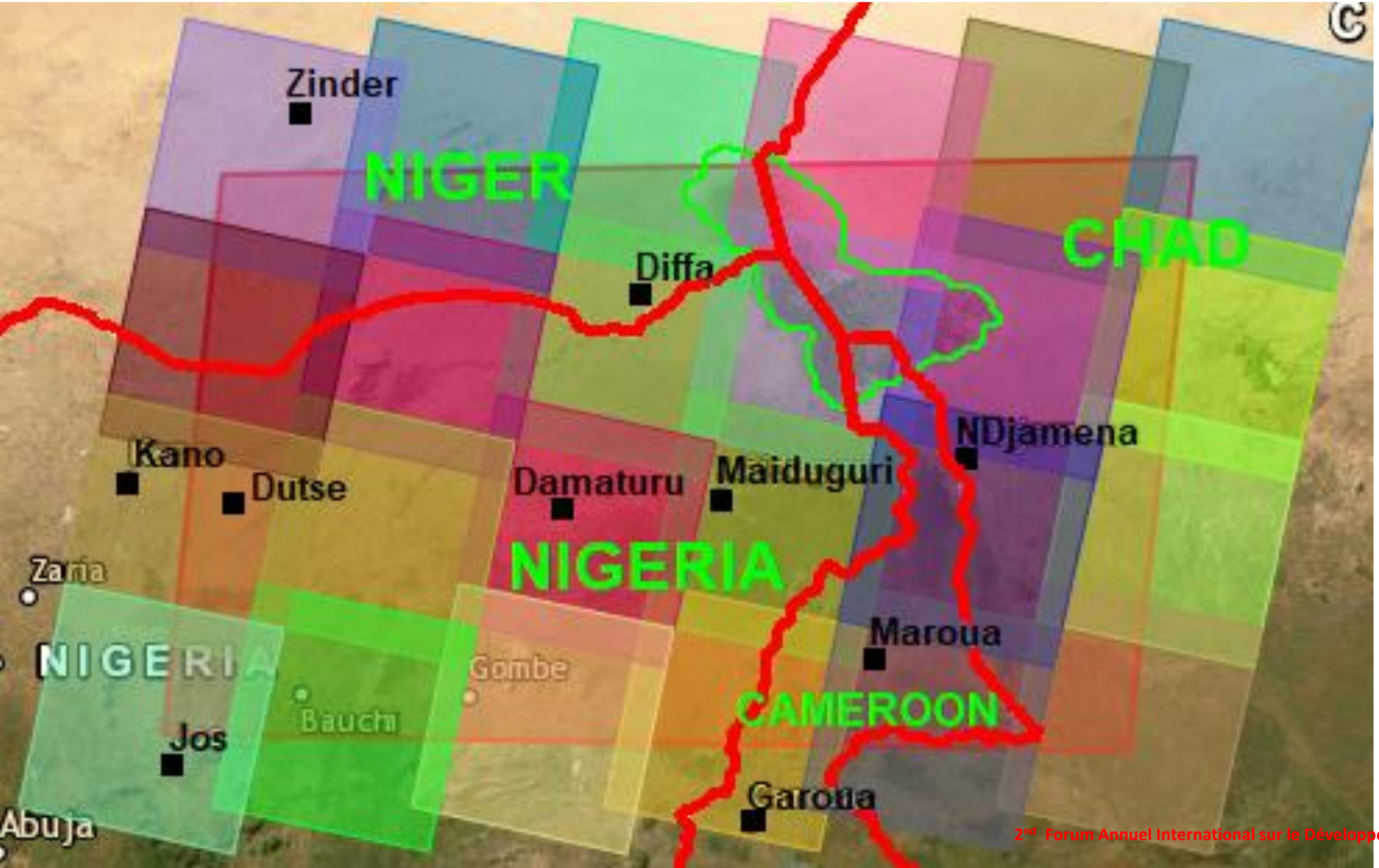


- Entire Lake Chad Basin
- **Available Vector data Nigerian Sector of the Lake Chad Region**

Available Geospatial Data @ Level A

- Vector Data inform of boundaries, river systems
- Raster Data (Landsat-8 Operational Land Imager)
  - Grid Data (Temperature)
  - Grid Data (Soil Moisture)
  - Grid Data (Vegetation);
- Grid Data (Aster DEM – 30m; and Alos PALSAR 12.5m) for Flood and Hydrology Studies;
- Grid Data (Rainfall – Precipitating Cloud);
- Grid Data (Slope, Relief);

ROI for Available Raster Data



Landsat Tiles Available@ROI: 2013 - 2023

- **24 Landsat 8 OLI** FootPrint (Paths and Rows) for LULC
- **Used for extraction of:**

Land Surface Temperature; Soil Moisture; Water Bodies & Hydrology; Vegetation Studies; etc

Summary of Data Available, Resolutions and Period

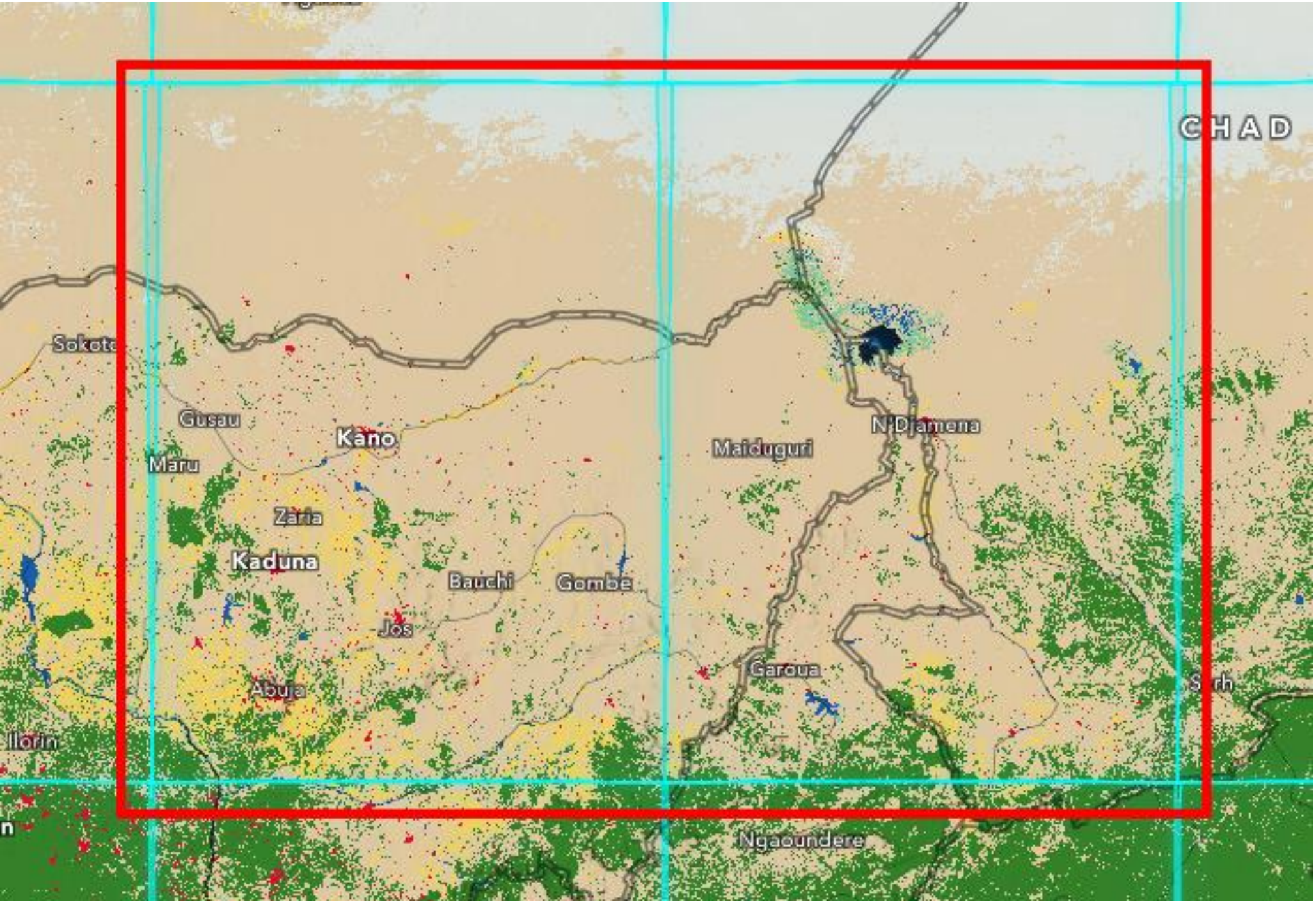
SN	Type of Data	Coverage	Spatial Resolution	Date Available
1.	Aster DEM (Elevation) Alos PALSAL-2 DEM	Entire LC Watershed Nigeria &Cameroon	30 m 12.5 m	2009 2011
2.	Sentinel–2 (Optical image) LULC, Flood Inputs	Nigeria Sector of Lake Chad	10 m	2015–Date
3.	Landsat - 8 OLI (OLI) Landsat TM, ETM+	Substantial Part of Active Lake Chad Basin	30 m	2013–Mar 2023 1990 – 2003
4.	**Climate Data: Rainfall & Temp. Records Met-Station**	**Maiduguri, Nguru, Potiskum, Diffa, Maine - Soroa**	**In-Situ Station**	**1961–2020** **1961 - 2017**
6.	Digital Soil Map	Types and Classes: Entire Lake Chad Basin	FAO	FAO

Opportunities – preparation for L-B Processing

- Sustainable monitoring of Lake Chad environmental resources at local, national and regional levels;
- Possibility for Regional studies to meet LCBC assigned mandate;
- **LULC trend – 2017 to 2022 (10m);**
- Determination of Land surface Temperature;
- Determination of Vegetation phenology;
- Determination of Soil Moisture trend;
- Hydrological and Hydrogeological Studies;

Water Balance (WB) components

- Ability to determine Evapotranspiration (input to Surface Energy Balance Algorithm for Land (SEBAL) and for (WB)); and
- Drought and Flood Monitoring Facilities



Variable mapped: LULC: 2017, 2018, 2019, 2020, 2021, 2022 Sentinel-2 L2A

Major Challenges for Sustainability

- Hardware in terms of storage capacities;
- Processing large volume of spatial data to thematic products required different licensed software packages;
- Most of Licensed Image Processing Software Packages are lacking in the Image Processing Laboratories;
- Networking for dissemination of data and information;
- Field verification and inability to cover strategic areas;
- Inability to validate and calibrate the processed rainfall results from space borne system with in-situ records.

MERCI POUR VOTRE AIMABLE ATTENTION

THANK YOU FOR YOUR KIND ATTENTION